Amendments to the Drawings

None.

Remarks

Applicant thanks the Examiner for the Written Office Action.

With regard to the substantive portion of the Written Office Action, claim 22 was rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement and claims 1-3, 22, and 24 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter. Claims 1-25 were rejected under 35 U.S.C. 103(a) as being unpatentable over RE 35085 issued to Sanderson.

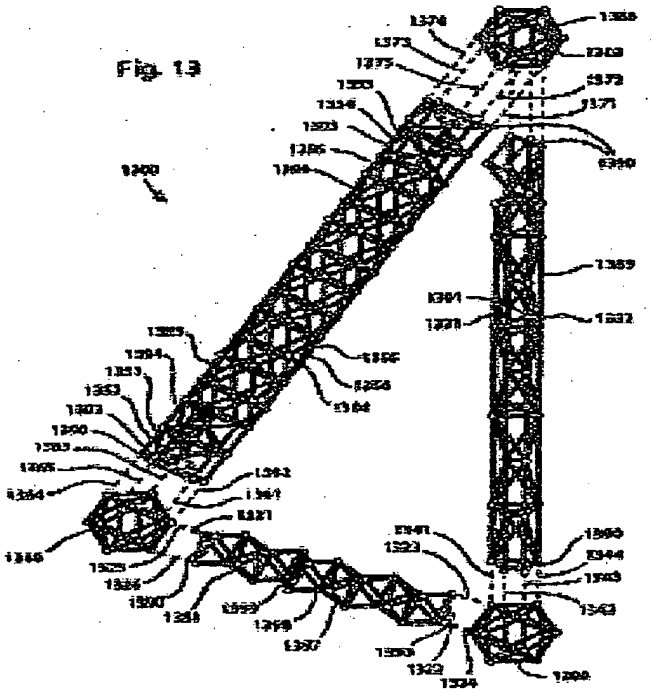
In response to Examiner's Written Office Action, claims 2, 3, 22 and 24 have been amended. Claims 2-3 and 22 have been amended to include limitations as described on page 7, lines 5-17 of the specification. In addition, Claim 22 has been amended to include limitations as described on page 17, line 17-page 19 line 8, and as shown in figures 13-19. Claim 24 has been amended to include limitations as described on page 20, lines 3-7 of the specification and as shown in figures 3-19. Accordingly, it is believed that claims 2-3, 22 and 24 as amended present no new matter.

35 U.S.C. § 112, First Paragraph

Applicant respectfully submits that claim 22 as amended is patentable under 35 U.S.C. § 112, first paragraph and complies with the enablement requirement. Section § 112 requires only that the claims be objectively enabled. *In re Wright,* 999 F.2d 1557, 1561 (Fed. Cir. 1993). It is irrelevant whether the scope of the claims are enabled "through broad terminology or illustrative examples." *Id.* So long as the specification provides sufficient detail for one skilled in the art how to make and use the claimed invention without undue experimentation, the claims are enabled. *Id.*

As amended, claim 22 includes the limitations "in which said primary, left-hand and right-hand nodes and several additional nodes are all positioned exteriorly so as to form an oblong shape substantially resembling a tube having *a polygonal cross section*, further comprising several other, interiorly-positioned nodes." (emphasis added.) A polygonal shape, is generally defined as a shape "having many sides or relating to a surface marked by polygons." "Polygonal," *WordNet® 3.0*, Princeton University, 27 Jun. 2007, Dictionary.com *at* http://dictionary.reference.com/browse/polygonal. Moreover, a polygon is generally defined as "a figure, esp. a closed plane figure, having three or more, usually straight, sides." "Polygon," *Dictionary.com Unabridged (v 1.1)*, Random House, Inc. 27 Jun. 2007, Dictionary.com *at* http://dictionary.reference.com/browse/polygon.

One skilled in the art would understand that the limitation, "a polygonal cross-section" is inherently shown in the specification in figure 13 based on the following:



Furthermore, figures 14-19 show complex cells, or cross-sections, which correspond to Figure 13, and which are polygons. *See* Figures 14019; *see also*, Page 17, lines 17-20; and Page 18, lines 10-12; 14-16; 18-24; and lines 27-29. For example, Figure 14 is "a complex cell 1400 nominally corresponding to substructure 1394 of Fig. 13 . . . Cell 1400 also includes a top an bottom 1410 that are each a regular pentagon . . . An internal nexus point [or node] 1401 is slightly below the center point of cell 1400." Page 17, lines 17-21. Accordingly, one skilled in the art would understand that the nodes are positioned to form an oblong shape substantially resembling a tube having a polygonal cross-section. Therefore, it is believed that claim 22 is described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

35 U.S.C. § 112, Second Paragraph

Applicant respectfully submits that claim 1, as amended, satisfies the definiteness requirement of 35 U.S.C § 112, second paragraph. The standard for definiteness is whether the claims, "read in light of the specification, reasonably apprise those skilled in the art both of the utilization and scope of the invention." *Hybritech Inc. v. Monoclonal Antibodies,* 231 U.S.P.Q. 81 (Fed. Cir. 1986). As shown and described in the specification, there are two axes that form a base plane - the primary axis and the left-hand nodes axis. The fact that the left-hand nodes are distal from the primary axis means that the two axes are parallel. Accordingly, it is believed that the definiteness requirement of 35 U.S.C. § 112, second paragraph, is met by claim 1.

Applicant respectfully submits that claims 2-3 and 22, as amended, satisfy the definiteness requirement of 35 U.S.C § 112, second paragraph. By "said nodes" Applicant

means primary, left hand and right hand nodes. Accordingly, as amended, Claims 2, 3 and 22 each include the following limitation: "in which said primary, left-hand and right-hand nodes." As a result, it is believed that the definiteness requirement of 35 U.S.C. § 112, second paragraph, is met by claims 2-3 and 22.

Applicant respectfully submits that claim 24, as amended, satisfies the proper antecedent basis requirement of 35 U.S.C § 112, second paragraph. Claim 24 is amended as follows: "further including wherein at least three struts are not nominally, mutually coplanar and further including..." Therefore, it is believed that the antecedent basis requirement of 35 U.S.C. § 112, second paragraph, is met by claim 24.

35 U.S.C. § 103

Applicant believes that claims 1-25 are not obvious over Sanderson, and are patentable under 35 U.S.C. § 103, for the following reasons:

Each and every limitation not taught or suggested

Applicant respectfully submits that Claims 1-25 are not obvious over Sanderson under 35 U.S.C. § 103(a). In particular, Applicant respectfully submits that Claims 1-25 are not obvious over Sanderson, because independent Claims 1 and 23 are not obvious over Sanderson and Claims 2-22 and 24-25 depend from independent Claims 1 and 23 respectively. "To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." MANUAL OF PATENT EXAMINING PROCEDURE § 2143.03 (2007).

As presented, independent Claims 1 and 23 include limitations of the angles of the left-hand and right-hand struts. Additionally, claim 22 includes the limitation of an

elliptical cross-section. However, it is believed that Sanderson does not teach the limitations of the angles and the elliptical cross-section.

Applicant believes that the angles recited in Claim 1 are not a matter of design choice and are critical to achieve benefits of structural strength, connectivity and packing of the structures, and minimum inventory with maximum diversity. Applicant would like to demonstrate this by starting with some of the possible angles as defined in claim 1:

j	k	m	n	Angle
1	0	0	0	20.9
0	1	0	0	31.7
0	0	1	0	36.0
0	0	0	1	37.4
2	0	0	0	41.8
1	0	0	1	58.3
0	2	0	0	63.4
0	1	0	1	69.1
0	0	2	0	72.0
2	0	0	1	79.2

The coefficients j, k, m, n are given to exemplify the computation of the angles following the formula of claim 1: "an acute angle about equal to $j\times20.9° + k\times31.7° + m\times36° + n\times37.4°$, where j, k, m, and n are each an integer ≥ 0"

These angles help define some triangles:

Code	Angle 1	Angle 2	Angle 3	Length 1	Length 2	Length 3
2	90.0	69.1	20.9	1.000	2.618	2.803
3	90.0	58.3	31.7	1.000	1.618	1.902
7	135.0	31.7	13.3	1.000	2.288	3.078
11	36.0	108.0	36.0	1.000	1.618	1.000
12	72.0	72.0	36.0	1.000	1.618	1.618
19	31.7	110.9	37.4	1.000	1.539	0.866
20	58.3	58.3	63.4	1.000	0.951	0.951
22	69.1	69.1	41.8	1.000	1.401	1.401
23	135.0	20.9	24.1	1.618	1.414	2.803
24	45.0	31.7	103.3	2.618	1.414	1.902
25	45.0	58.3	76.7	2.618	2.288	1.902
26	45.0	69.1	65.9	3.618	3.702	2.803
27	45.0	20.9	114.1	3.618	1.414	2.803
30	31.7	31.7	116.6	1.618	0.951	0.951

31	31.7	69.1	79.2	1.618	1.539	0.866
32	121.7	20.9	37.4	1.618	0.951	2.267
33	20.9	20.9	138.2	1.618	0.866	0.866
35	58.3	20.9	100.8	2.618	0.951	2.267
49	76.7	24.1	79.2	2.288	0.951	2.267
50	76.7	65.9	37.4	2.288	3.441	3.669
51	24.1	114.1	41.8	2.288	3.133	1.401
53	13.3	103.3	63.4	3.702	4.029	0.951
54	63.4	79.2	37.4	0.951	1.539	1.401
55	37.4	100.8	41.8	0.951	1.401	0.866

The code column is a number that uniquely identifies the triangles. For the convenience of the reader the length of the triangles sides are given. The lengths are expressed without unit and one skilled in the art would be able to multiply the lengths by a given factor to produce a specific implementation. Please note also that one length is equal to the length of the corresponding strut plus the diameter of one node, i. e. they go from node center to node center.

Here is a list of some of the tetrahedra that can be built with these triangles:

Code	L1	L2	L3	L4	L5	L6	Vol	Face 1	Face 2	Face 3	Face 4
1	1.000	1.000	1.000	1.618	1.902	1.618	0.218	8_1	3_1	12_1	3_1
2	1.000	1.000	1.000	1.618	1.000	1.000	0.083	8_1	11_1	11_1	8_1
3	1.000	1.000	1.000	1.618	1.618	1.000	0.135	8_1	12_1	11_1	11_1
4	1.000	1.000	1.000	1.000	1.414	1.618	0.135	8_1	1_1	11_1	9_1
5	1.000	1.000	1.000	1.618	1.618	1.618	0.218	8_1	12_1	12_1	12_1
6	1.000	1.000	1.000	1.618	2.288	1.618	0.135	8_1	13_1	12_1	13_1
7	1.000	1.000	1.000	1.539	0.866	0.866	0.042	8_1	19_1	19_1	21_1
8	1.000	1.000	1.000	0.951	0.951	0.951	0.109	8_1	20_1	20_1	20_1
9	1.000	0.951	0.951	2.618	2.288	2.267	0.286	20_1	10_1	35_1	49_1
10	1.000	0.951	0.951	1.618	1.000	0.951	0.067	20_1	11_1	30_1	20_1
11	1.000	0.951	0.951	1.618	1.618	0.951	0.109	20_1	12_1	30_1	30_1
12	1.000	0.951	0.951	1.618	1.618	2.267	0.109	20_1	12_1	32_1	32_1
13	1.000	0.951	0.951	1.618	2.288	2.267	0.177	20_1	13_1	32_1	49_1
14	1.000	0.951	0.951	3.702	3.702	4.029	0.462	20_1	16_1	53_1	53_1
15	1.000	0.951	0.951	1.539	0.866	1.401	0.109	20_1	19_1	54_1	55_1
16	1.000	0.951	0.951	1.401	1.401	1.539	0.177	20_1	22_1	54_1	54_1
17	1.000	0.951	0.951	0.866	0.866	1.401	0.067	20_1	21_1	55_1	55_1
18	1.618	1.414	1.414	2.618	1.618	1.414	0.135	28_1	11_2	34_1	28_1
19	1.618	1.414	1.414	2.618	2.618	1.414	0.218	28_1	12_2	34_1	34_1
20	1.618	1.414	1.414	1.000	1.000	1.618	0.135	28_1	11_1	9_1	9_1
21	1.618	1.414	1.414	1.618	1.000	1.000	0.218	28_1	12_1	9_1	1_1

22	1.618	1.414	1.414	2.618	2.618	1.902	0.571	28_1	12_2	24_1	24_1
23	1.618	1.414	1.414	1.000	1.000	1.732	0.052	28_1	11_1	5_1	5_1
24	1.618	1.414	1.414	0.866	0.866	0.866	0.026	28_1	33_1	44_1	44_1
25	1.000	0.866	0.866	1.618	1.414	0.866	0.067	21_1	9_1	33_1	44_1
26	1.000	0.866	0.866	1.618	1.000	0.866	0.026	21_1	11_1	33_1	21_1
27	1.000	0.866	0.866	1.618	1.618	0.866	0.042	21_1	12_1	33_1	33_1
28	1.000	0.866	0.866	1.618	1.000	1.539	0.109	21_1	11_1	31_1	19_1
29	1.000	0.866	0.866	1.618	2.288	1.539	0.067	21_1	13_1	31_1	48_1
30	1.000	0.866	0.866	1.618	1.618	1.539	0.177	21_1	12_1	31_1	31_1
31	1.000	0.866	0.866	1.539	0.866	1.000	0.067	21_1	19_1	19_1	21_1
32	1.000	0.866	0.866	1.539	0.866	1.618	0.067	21_1	19_1	31_1	33_1
33	1.000	0.866	0.866	1.401	1.401	0.951	0.109	21_1	22_1	55_1	55_1
34	1.000	1.618	1.000	1.000	1.414	1.618	0.135	11_1	1_1	12_1	9_1
35	1.000	1.618	1.000	2.618	2.803	2.618	0.353	11_1	2_1	12_2	2_1
36	1.000	1.618	1.000	1.000	1.414	1.414	0.083	11_1	1_1	9_1	17_1
37	1.000	1.618	1.000	1.618	1.902	1.618	0.135	11_1	3_1	8_2	3_1
38	1.000	1.618	1.000	2.618	2.288	1.618	0.218	11_1	10_1	11_2	13_1
39	1.000	1.618	1.000	1.000	1.414	2.288	0.083	11_1	1_1	13_1	18_1
40	1.000	1.618	1.000	1.618	1.414	1.618	0.218	11_1	9_1	8_2	9_1
41	1.000	1.618	1.000	2.618	2.288	2.288	0.353	11_1	10_1	9_2	15_1
42	1.000	1.618	1.000	1.618	1.000	1.618	0.135	11_1	11_1	8_2	11_1
43	1.000	1.618	1.000	1.618	1.618	2.288	0.218	11_1	12_1	1_2	13_1
44	1.000	1.618	1.000	1.618	2.288	2.288	0.135	11_1	13_1	1_2	15_1
45	1.000	1.618	1.000	2.618	2.288	2.618	0.353	11_1	10_1	12_2	10_1
46	1.000	1.618	1.000	1.618	1.618	1.618	0.218	11_1	12_1	8_2	12_1
47	1.000	1.618	1.000	1.618	1.414	2.288	0.135	11_1	9_1	1_2	18_1
48	1.000	1.618	1.000	2.618	2.288	3.078	0.218	11_1	10_1	3_2	7_1
49	1.000	1.618	1.000	1.000	1.618	1.902	0.135	11_1	11_1	3_1	3_1
50	1.000	1.618	1.000	2.288	1.732	1.414	0.218	11_1	4_1	29_1	5_1
51	1.000	1.618	1.000	3.702	3.078	2.288	0.218	11_1	6_1	18_2	7_1
52	1.000	1.618	1.000	3.702	3.078	3.702	0.218	11_1	6_1	15_2	6_1
53	1.000	1.618	1.000	3.702	3.702	3.702	0.571	11_1	16_1	15_2	16_1
54	1.000	1.618	1.000	1.414	1.414	2.288	0.135	11_1	17_1	29_1	18_1
55	1.000	1.618	1.000	2.288	2.618	2.288	0.218	11_1	10_1	17_2	10_1
56	1.000	1.618	1.000	2.288	2.618	2.803	0.353	11_1	10_1	5_2	2_1
57	1.000	1.618	1.000	2.288	1.732	2.288	0.218	11_1	4_1	17_2	4_1
58	1.000	1.618	1.000	1.539	0.866	1.539	0.109	11_1	19_1	20_2	19_1
59	1.000	1.618	1.000	1.401	1.401	1.401	0.177	11_1	22_1	21_2	22_1
60	1.414	0.866	0.866	1.618	1.000	1.539	0.067	44_1	9_1	31_1	19_1
61	1.414	0.866	0.866	1.618	2.288	1.539	0.109	44_1	29_1	31_1	48_1
62	1.414	0.866	0.866	1.000	2.288	1.539	0.042	44_1	18_1	19_1	48_1
63	1.618	0.951	0.951	1.618	1.618	0.951	0.067	30_1	8_2	30_1	30_1
64	1.618	0.951	0.951	2.618	2.618	2.267	0.286	30_1	12_2	35_1	35_1
65	1.618	0.951	0.951	2.618	1.618	2.267	0.177	30_1	11_2	35_1	32_1
66	1.618	0.951	0.951	3.702	3.702	4.029	0.286	30_1	15_2	53_1	53_1
67	1.618	0.951	0.951	2.288	2.288	2.267	0.286	30_1	17_2	49_1	49_1
68	1.618	0.951	0.951	1.539	1.539	1.401	0.177	30_1	20_2	54_1	54_1
69	1.618	0.951	0.951	0.951	2.267	1.618	0.109	30_1	32_1	30_1	32_1
70	1.618	0.951	0.951	1.401	1.401	0.866	0.109	30_1	21_2	55_1	55_1
71	1.618	0.951	0.951	1.401	1.401	1.539	0.109	30_1	21_2	54_1	54_1

72	2.618	1.414	1.414	1.000	2.803	1.618	0.218	34_1	2_1	9_1	23_1
73	2.618	1.414	1.414	1.618	1.618	1.000	0.218	34_1	11_2	9_1	9_1
74	1.618	0.866	0.866	1.618	1.618	1.539	0.109	33_1	8_2	31_1	31_1
75	1.618	0.866	0.866	3.702	3.702	3.441	0.244	33_1	15_2	52_1	52_1
76	1.618	0.866	0.866	1.401	1.401	0.951	0.067	33_1	21_2	55_1	55_1
77	0.951	1.401	0.866	1.539	1.401	0.951	0.109	55_1	54_1	54_1	55_1
78	0.951	1.401	0.866	2.267	1.618	1.539	0.177	55_1	32_1	55_2	31_1
79	0.951	1.401	0.866	1.401	1.539	2.288	0.109	55_1	54_1	44_2	48_1
80	0.951	1.401	0.866	1.401	1.539	1.618	0.177	55_1	54_1	21_2	31_1
81	1.618	2.288	1.414	1.618	1.000	1.000	0.218	29_1	12_1	13_1	1_1
82	1.618	2.288	1.414	2.618	1.618	1.000	0.353	29_1	11_2	10_1	9_1
83	1.618	2.288	1.414	2.618	2.618	1.902	0.571	29_1	12_2	25_1	24_1
84	1.618	2.288	1.414	1.618	1.000	1.618	0.353	29_1	12_1	1_2	9_1
85	1.618	2.288	1.414	1.618	1.000	2.288	0.218	29_1	12_1	17_2	18_1
86	1.000	1.539	0.866	2.618	2.288	1.539	0.109	19_1	10_1	30_2	48_1
87	1.000	1.539	0.866	1.618	1.618	1.539	0.177	19_1	12_1	20_2	31_1
88	1.000	1.401	1.401	2.618	2.288	1.401	0.177	22_1	10_1	33_2	44_2
89	1.000	1.401	1.401	1.618	1.618	1.401	0.286	22_1	12_1	21_2	21_2
90	1.000	1.401	1.401	1.618	2.288	1.401	0.109	22_1	13_1	21_2	44_2
91	1.000	1.401	1.401	1.618	1.618	2.490	0.286	22_1	12_1	19_2	19_2
92	1.000	1.401	1.401	2.288	2.288	1.401	0.286	22_1	15_1	44_2	44_2
93	1.000	1.401	1.401	3.702	3.702	2.490	0.286	22_1	16_1	48_2	48_2
94	1.000	1.414	1.414	1.618	1.618	2.803	0.135	17_1	12_1	23_1	23_1
95	1.000	1.618	1.414	2.618	2.803	1.618	0.218	9_1	2_1	11_2	23_1
96	1.000	1.618	1.414	1.618	1.902	2.618	0.353	9_1	3_1	11_2	24_1
97	1.000	2.288	1.414	1.618	1.902	2.618	0.218	18_1	3_1	9_2	24_1
98	1.000	2.288	1.414	1.618	1.618	2.803	0.135	18_1	12_1	5_2	23_1
99	0.951	1.539	1.401	2.618	2.267	1.539	0.286	54_1	35_1	30_2	55_2
100	0.951	1.539	1.401	1.539	1.401	1.618	0.286	54_1	54_1	20_2	21_2
101	0.951	1.539	1.401	1.539	1.401	2.618	0.177	54_1	54_1	30_2	33_2
102	0.951	1.539	1.401	2.267	1.618	1.401	0.177	54_1	32_1	55_2	21_2
103	0.951	1.539	1.401	2.267	1.618	2.490	0.286	54_1	32_1	54_2	19_2
104	0.951	1.539	1.401	1.401	1.539	0.951	0.177	54_1	54_1	54_1	54_1
105	0.951	1.539	1.401	2.267	2.288	1.401	0.286	54_1	49_1	55_2	44_2
106	0.951	1.539	1.401	1.401	1.539	2.267	0.286	54_1	54_1	55_2	55_2
107	0.951	1.539	1.401	2.267	2.618	2.490	0.462	54_1	35_1	54_2	31_2
108	1.000	1.618	1.618	2.618	2.803	2.288	0.571	12_1	2_1	9_2	5_2
109	1.000	1.618	1.618	1.618	1.902	1.000	0.218	12_1	3_1	12_1	3_1
110	1.000	1.618	1.618	2.618	2.288	1.618	0.353	12_1	10_1	11_2	1_2
111	1.000	1.618	1.618	2.618	2.288	2.618	0.571	12_1	10_1	12_2	9_2
112	1.000	1.618	1.618	1.618	1.618	2.618	0.353	12_1	12_1	11_2	11_2
113	1.000	1.618	1.618	1.618	2.288	1.618	0.218	12_1	13_1	8_2	1_2
114	1.000	1.618	1.618	1.618	2.288	2.288	0.353	12_1	13_1	1_2	17_2
115	1.000	1.618	1.618	2.618	2.803	3.702	0.571	12_1	2_1	13_2	4_2
116	1.000	1.618	1.618	1.618	1.618	1.618	0.353	12_1	12_1	8_2	8_2
117	1.000	1.618	1.618	2.618	2.288	3.702	0.353	12_1	10_1	13_2	18_2
118	1.000	1.618	1.618	3.702	3.078	2.618	0.353	12_1	6_1	13_2	3_2
119	1.000	1.618	1.618	2.288	2.288	1.000	0.218	12_1	15_1	13_1	13_1
120	1.000	1.618	1.618	3.702	3.702	2.618	0.571	12_1	16_1	13_2	13_2
121	1.000	1.618	1.618	2.288	2.288	2.803	0.571	12_1	15_1	5_2	5_2

122	1.000	1.618	1.618	3.702	3.702	3.702	0.924	12_1	16_1	15_2	15_2
123	1.000	1.618	1.618	2.288	3.078	2.618	0.353	12_1	7_1	9_2	3_2
124	1.000	1.618	1.618	2.288	2.288	2.618	0.571	12_1	15_1	9_2	9_2
125	1.000	1.618	1.618	2.288	2.288	3.702	0.218	12_1	15_1	18_2	18_2
126	1.000	1.618	1.618	3.702	3.702	4.980	0.571	12_1	16_1	7_2	7_2
127	1.000	1.618	2.288	2.618	2.803	1.618	0.218	13_1	2_1	11_2	5_2
128	1.000	1.618	2.288	1.618	1.902	2.618	0.353	13_1	3_1	11_2	25_1
129	1.000	1.618	2.288	2.618	2.288	2.618	0.353	13_1	10_1	12_2	28_2
130	1.000	1.618	2.288	1.618	2.288	2.618	0.218	13_1	13_1	11_2	28_2
131	1.000	1.618	2.288	3.078	3.702	2.618	0.571	13_1	6_1	3_2	29_2
132	1.000	1.618	2.288	2.803	2.618	2.288	0.218	13_1	2_1	5_2	28_2
133	1.618	0.951	2.267	2.618	2.618	2.267	0.286	32_1	12_2	35_1	21_3
134	1.618	0.951	2.267	1.618	1.618	2.267	0.286	32_1	8_2	32_1	22_2
135	1.618	0.951	2.267	2.618	3.702	2.267	0.462	32_1	13_2	35_1	44_3
136	1.618	0.951	2.267	1.618	2.618	2.267	0.177	32_1	11_2	32_1	21_3
137	1.618	0.951	2.267	3.702	2.618	4.029	0.462	32_1	13_2	53_1	19_3
138	1.618	0.951	2.267	2.288	2.618	2.267	0.462	32_1	9_2	49_1	21_3
139	1.618	0.951	2.267	2.288	3.702	2.267	0.286	32_1	18_2	49_1	44_3
140	1.618	0.951	2.267	3.702	4.236	4.029	0.748	32_1	10_2	53_1	31_3
141	1.618	0.951	2.267	2.267	2.267	2.618	0.462	32_1	22_2	35_1	21_3
142	1.000	3.702	3.702	2.618	2.803	1.618	0.571	16_1	2_1	13_2	4_2
143	2.618	0.951	2.267	2.267	4.029	2.618	0.748	35_1	19_3	35_1	19_3
144	2.618	0.951	2.267	2.267	2.267	2.618	0.462	35_1	21_3	35_1	21_3
145	2.618	0.951	2.267	4.029	2.267	3.702	0.748	35_1	19_3	53_1	44_3
146	2.618	0.951	2.267	3.702	5.991	4.029	0.748	35_1	18_3	53_1	48_3
147	2.618	0.951	2.267	3.702	4.236	4.029	1.210	35_1	9_3	53_1	31_3
148	2.618	0.951	2.267	2.618	4.236	2.267	0.462	35_1	11_3	35_1	33_3
149	2.618	0.951	2.267	2.618	2.618	2.267	0.748	35_1	8_3	35_1	21_3
150	2.288	0.951	2.267	2.288	4.236	2.267	0.462	49_1	34_2	49_1	33_3
151	2.288	0.951	2.267	3.702	2.618	4.029	0.748	49_1	29_2	53_1	19_3
152	2.288	0.951	2.267	2.618	3.702	2.267	0.748	49_1	29_2	35_1	44_3
153	1.000	2.618	2.288	2.803	2.618	1.000	0.353	10_1	2_1	2_1	10_1
154	1.000	2.618	2.288	1.902	1.618	2.288	0.571	10_1	3_1	25_1	17_2
155	1.000	2.618	2.288	3.078	2.288	1.618	0.218	10_1	7_1	3_2	17_2
156	1.000	2.618	2.288	2.618	2.288	1.618	0.571	10_1	10_1	12_2	17_2
157	1.000	2.618	2.288	1.618	1.902	2.618	0.571	10_1	3_1	12_2	25_1
158	1.000	2.618	2.288	2.618	2.803	1.618	0.353	10_1	2_1	12_2	5_2
159	1.000	2.288	2.288	2.618	2.803	1.618	0.571	15_1	2_1	9_2	5_2
160	2.288	1.539	0.866	1.618	2.288	1.539	0.109	48_1	17_2	20_2	48_1
161	1.618	1.539	0.866	1.539	1.539	1.618	0.286	31_1	20_2	20_2	31_1
162	1.618	1.539	0.866	2.618	1.618	1.539	0.286	31_1	11_2	30_2	31_1
163	1.618	1.539	0.866	2.618	2.288	1.539	0.177	31_1	9_2	30_2	48_1

The code column is a number that uniquely identifies the tetrahedra. For the convenience of the reader the lengths of the tetrahedra's edges are given in the next six columns followed by the tetrahedra's volume. Again, the lengths are expressed without

unit and one skilled in the art would be able to multiply the lengths by a given factor to produce a specific implementation.

The last four columns represent the codes of the tetrahedron's four triangular faces. The first number refers to the unique shape of the triangle.

The second number represent a scaling power of the Golden Ratio (square root of five plus one divided by two which is about equal to 1.618...) If the 2nd number is one then the scale factor is one, if it is 2 then the scale factor is the Golden Ratio, if it is three then the scale factor is Golden Ratio square, etc...

The triangles that constitute the faces of all the preceding tetrahedra are described in the following table:

Code	Legth 1	Legth 2	Legth 3	Angle 1	Angle 2	Angle 3
1	1.000	1.000	1.414	90.0	45.0	45.0
2	1.000	2.618	2.803	90.0	69.1	20.9
3	1.000	1.618	1.902	90.0	58.3	31.7
4	1.000	2.288	1.732	45.0	110.9	24.1
5	1.000	1.414	1.732	90.0	54.7	35.3
6	1.000	3.702	3.078	45.0	121.7	13.3
7	1.000	2.288	3.078	135.0	31.7	13.3
8	1.000	1.000	1.000	60.0	60.0	60.0
9	1.000	1.618	1.414	60.0	82.2	37.8
10	1.000	2.618	2.288	60.0	97.8	22.2
11	1.000	1.618	1.000	36.0	108.0	36.0
12	1.000	1.618	1.618	72.0	72.0	36.0
13	1.000	1.618	2.288	120.0	37.8	22.2
15	1.000	2.288	2.288	77.4	77.4	25.2
16	1.000	3.702	3.702	82.2	82.2	15.5
17	1.000	1.414	1.414	69.3	69.3	41.4
18	1.000	2.288	1.414	22.2	142.2	15.5
19	1.000	1.539	0.866	31.7	110.9	37.4
20	1.000	0.951	0.951	58.3	58.3	63.4
21	1.000	0.866	0.866	54.7	54.7	70.5
22	1.000	1.401	1.401	69.1	69.1	41.8
23	1.618	1.414	2.803	135.0	20.9	24.1
24	2.618	1.414	1.902	45.0	31.7	103.3
25	2.618	2.288	1.902	45.0	58.3	76.7
28	1.618	1.414	1.414	55.1	55.1	69.8
29	1.618	2.288	1.414	37.8	97.8	44.5
30	1.618	0.951	0.951	31.7	31.7	116.6
31	1.618	1.539	0.866	31.7	69.1	79.2

32	1.618	0.951	2.267	121.7	20.9	37.4
33	1.618	0.866	0.866	20.9	20.9	138.2
34	2.618	1.414	1.414	22.2	22.2	135.5
35	2.618	0.951	2.267	58.3	20.9	100.8
44	1.414	0.866	0.866	35.3	35.3	109.5
48	2.288	1.539	0.866	13.3	24.1	142.6
49	2.288	0.951	2.267	76.7	24.1	79.2
52	3.702	3.441	0.866	13.3	65.9	100.8
53	3.702	4.029	0.951	13.3	103.3	63.4
54	0.951	1.539	1.401	63.4	79.2	37.4
55	0.951	1.401	0.866	37.4	100.8	41.8

The code column is a number that uniquely identifies the base triangles. The lengths of the triangles edges and angles are given. The lengths are expressed without unit and it would be able easy to multiply the lengths by a given factor to produce a specific implementation. Please note that a specific implementation may require some triangular faces to be scaled by the Golden Ratio.

The list of unique lengths for the edges of all these triangles and tetrahedra is:

0.866
0.951
1.000
1.401
1.414
1.539
1.618
1.732
1.902
2.267
2.288
2.490
2.618
2.803
3.078
3.441
3.702
4.029
4.236
4.980
5.991

Applicant believes that this clearly demonstrates that these angles are not a design choice and are critical in achieving the following benefits in a unique way:

Superior Structural Strength:

The rigidity and structural strength of a structure depends mainly on its ability to triangulate. The structure that achieves the most triangulation is the tetrahedron. We have demonstrated that with these angles and the triangular base formulated with claim 1 we are able to generate at least 163 different tetrahedra that can be used to rigidify the node-and-strut spine structure of claim 1.

Superior connectivity and packing:

Because so many tetrahedra share faces that are similar in other tetrahedra (only 39 triangular face shapes are necessary to compose at least 652 faces in 163 tetrahedra) those tetrahedra are able to connect and interface with each other in an efficient way to assemble and pack modular structures together while helping triangulate the hyperstrut spine structure of claim 1.

Minimum inventory with maximum diversity:

The angles recited in claim 1 have allowed the discovery of at least 163 tetrahedra. The 652 faces of these tetrahedra (163x4) can be built from an inventory of only 39 different triangular panels, a better than 16 to 1 ratio. Similarly the 978 edges of these tetrahedra (163*6) can be built from an inventory of only 21 different strut lengths, a better than 46 to 1 ratio.

This minimum inventory leads to economies of scale in production, supply chain management and assembly while allowing maximum diversity in the structural shapes and designs.

As a result, it is believed that Sanderson does not teach or suggest all the limitations of independent Claims 1 and 23. Therefore, it is believed that Claims 1-25 are patentable under 35 U.S.C. § 103(a).

Sanderson reference teaches away from claims

Applicant respectfully submits that claims 1-25 are patentable under 35 U.S.C. § 103 because it is believed that Sanderson teaches away from the system and method of claims 1-25. Sanderson describes "space frame systems that typically are used as construction toys, creative sculptures and educational aids." (Sanderson Col. 1, lines 16-17). The nodes described by Sanderson are not rigid; they are composed of "thin flat elements being composed of a semi-rigid material" (Sanderson Col. 7, lines 59-60) that are "assembled by slight deformation" (Sanderson Col. 6, line 47). The struts are "deformable tubes" (Sanderson Col. 8, line 65). The struts described by Sanderson are small: "the length of a strut is 20 centimeters" (Sanderson Col. 6, line 58) about eight inches and is not suited for architectural scale.

Accordingly, this means that in all practicality these nodes would not, and could not, be used in an architectural context where structural strength is of paramount importance for structural stability, security and liability, such as in the structure of the system and method of claims 1-25. Therefore, it is believed that claims 1-25 are patentable under 35 U.S.C. § 103.

Sanderson reference is non-analogous art

Applicant respectfully submits that claims 1-25 are patentable under 35 U.S.C. § 103 over Sanderson because Applicant believes that Sanderson is non-analogous art. If a cited reference "is not analogous art, it has no bearing on the obviousness of the patent

claim." *Jurgens v. McKasy,* 927 F.2d 1552, 18 USPQ2d 1031 (Fed. Cir. 1991), *cert. denied,* 502 U.S. 902 (1991). Moreover, under the two-step test for determining whether a prior art reference is non-analogous and thus not relevant in determining obviousness it must be determined (1) whether the reference is "within the field of the inventor's endeavor," and (2) if not, whether the reference is "reasonable pertinent to the particular problem with which the inventor was involved." *In re Deminski,* 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986).

In this instance, the field of the invention is architecture, and the present invention was created in order to solve problems associated with lack of strength and stability. However, the field of the invention of Sanderson is toys, creative sculptures, and educational aid. Additionally, Sanderson was not created in order to solve problems associated with architectural strength and stability. Sanderson teaches that its struts "are elongated tubular straws, which have oppositely positioned punctures or apertures along diameters that are near the ends of the struts. The ends of these struts receive the prongs in such a way that oppositely directed catches on the prongs project into the apertures, whereby the struts and the connectors become joined." This scheme relies on the material of the Sanderson nodes and struts being deformable. This clearly is not suitable for architecture and contrasts with Applicant's system.

Further, Sanderson's space frame system is based on cubic geometry which is a different geometry than what Applicant claims. It uses directions that "are angularly spaced in sequence from each other ... by 45 degrees" (Sanderson Col. 5, line 30-33). "It will be observed that the struts are of two lengths in accordance with the edges and diagonals of a cube." (Sanderson Col. 6, lines 31-34). Also, applicant believes that

introducing the angles that are claimed to the cubic system would not "be an obvious matter of design choice to a person of ordinary skill in the art" because doing so would double the strut inventory (four lengths instead of two) without adding any benefit structurally or in the diversity of shapes possible.

Accordingly, the Sanderson reference is not within the field of the inventor's endeavor, and is not reasonably pertinent to the particular problem solved by the present invention. Therefore, Applicant respectfully submits that Claims 1-25 are patentable under 35 U.S.C. § 103(a).

Conclusion

For these reasons, it is believed that none of the prior art teaches the claimed invention. Furthermore, it is believed that the foregoing amendment has adequate support in the specification, and accordingly there should be no new matter. Applicant believes the pending claims have addressed each of the issues pointed out by the Examiner in the Office Action. In light of the foregoing amendment, the claims should be in a condition for allowance. Should the Examiner wish to discuss any of the proposed changes, Applicant again invites the Examiner to do so by telephone conference.

Respectfully Submitted,

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Date: June 28, 2007

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